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RE: Docket No. E-00000D-09-0020

Docket Control:

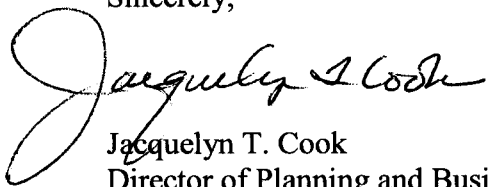
Enclosed is a Progress Report filed by Southwest Transmission Cooperative, Inc. (SWTC) on behalf of itself, Arizona Public Service Company (APS), Tucson Electric Power Company (TEP) and Sulphur Springs Valley Electric Cooperative, Inc. (SSVEC), as required by Decision No. 72031 of the 6th BTA, which states:

7. e. 1) "SWTC, APS, TEP and SSVEC shall jointly complete additional actions and file specified information relative to the Cochise County Study Group plan of service with the Commission as follows:

ii) By September 30, 2011, submit a progress report including in-service dates for the components of the plan of service identified in the June 30, 2011, facility study. The schedule shall reflect the most recent load forecast."

I have enclosed an original of this document, along with thirteen copies.

Sincerely,



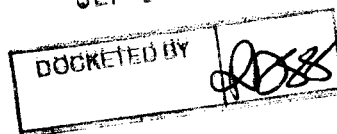
Jacquelyn T. Cook
Director of Planning and Business Development

Enclosures

c/V. Thor, APS
D. Bryan, SSVEC
R. Belval, TEP
J. Burson
Corp. Records

Arizona Corporation Commission
DOCKETED

SEP 30 2011



This progress report is hereby filed in response to the ACC Order 72031 Section 7-e-1-ii; due September 30, 2011, which states:

"SWTC, APS, Tucson Electric Power Company (TEP) and Sulphur Springs Valley Electric Cooperative ("SSVEC") shall jointly complete additional actions and file specified information related to the Cochise County Study Group plan of service with the Commission as follows:

By September 30, 2011, submit a progress report including in-service dates for the components of the plan of service identified in the June 30, 2011, facility study. This schedule shall reflect the most recent load forecast."

The Cochise County Study Group has continued to meet and study the issues requested by the ACC. We are pleased to report:

- (1) A list of projects that were identified in the 2009 technical report, with "planning level" estimates of costs and construction schedules are shown herein as Table 1A and 1B. This list of projects has been identified as required facilities to meet 2014 or 2021 load levels based on the most recent load forecast. (See ATTACHMENT A– Technical Study Report.) Projects in Table 1C are not required in the ten year time frame based on the most recent load forecast.
- (2) The group reviewed the June 2011 submission of the 29 projects at an estimated cost of \$103 million. The cost impact along with the construction schedule was too large.
- (3) For the initial phase of improvements, 69 kV circuits may to be operated as normally open and may be closed during a transmission outage. The initial phase is part of a flexible, long range strategy to make continuous improvements to the load serving capability of the 69kV system and provide continuity of service to the region.
- (4) PDS Consulting was hired and tasked with analyzing these proposed levels of improvements. The technical study can be seen in ATTACHMENT A – Technical Study Report
- (5) The group has identified projects from Table 1A and 1B that have been studied in more detail to determine suitability for a "short list" of projects that can be implemented in the 10 year time-frame. The potential projects identified are now staged into two levels of improvement:
 - a. In-service dates of the projects in the short list are based upon prior completion of existing ACC-approved projects by the utilities. In-service dates are subject to change depending on contractual negotiations, securing financing for the projects (including Congressional approval of funding for the Kartchner-Buffalo Soldier

- project by the Fort), ACC & RUS regulatory approvals, operational agreements, and other necessary approvals. FERC jurisdictional utilities provide transmission services under their individual OATTs. Any facilities that are not defined as transmission are not considered FERC jurisdictional.
- b. Projects listed in Table 1A and 1B are required by the 2014 or 2021 time frame, respectively, based on the technical analysis performed by PDS Consulting utilizing the most recent load forecast. Projects in Table 1C are not required in the ten year time frame based on the most recent load forecast.
- (6) The objective of the CCSG Contracts Group is to reach agreement on how costs of the various projects identified through the Cochise County Study Group study efforts may be objectively allocated. The CCSG Contracts Group has begun discussions on general principles for cost allocation and the development of criteria to objectively assign cost responsibility. The principles are that cost allocation should be based on benefits/needs associated with projects, cost effectiveness of each project as the best alternative, and flexibility on selection and timing to implement projects.

The CCSG Technical Group was asked to develop a methodology to identify system transmission or other physical power delivery elements that would realize improved reliability attributed to each of the identified projects. The results are to be tabulated to include pre- and post-project metrics (e.g. voltage, facility loading, etc.). The CCSG Contracts Group will develop the final allocation methodology based upon the benefits/needs identified by the Technical Group.

This progress report is filed on behalf of the group by SWTC. The group has agreed this report is an accurate summary other than individual company comments that may have been filed.

TABLE 1A: 2014 In-Service Date Projects

Cochise County Study Group 2014 In Service Date Projects				
Project ID	Description of Construction Element	Entity	In-service year	2011 Estimated Cost
2	Hereford -Palominas 69 kV Tie New (2 mi.)	SSVEC	2014	\$950,000
6	Ramsey 69 kV Breaker and Capacitor (8 MVar)	SSVEC	2014	\$580,000
9	Hawes 69 kV Breaker and Capacitor (8 MVar)	SSVEC	2014	\$1,000,000
10	Pueblo Substation Breaker and Capacitor	SSVEC	2014	\$1,000,000
16	Webb - Tombstone Jct 69 kV Line Rebuild	SSVEC	2014	\$15,470,000
19	Webb 2-69 kV Breakers & a Cap. (13.2 MVar)	SSVEC	2014	\$1,000,000
21	Loop Webb - Tombstone 69 kV into Boothill	SSVEC	2014	\$550,000
30	Huachuca 69 kV Breaker and Capacitor (8 MVar)*	SSVEC	2014	\$580,000
31	Benson 2- 69 kV Breaker & Capacitor (14.4 MVar)*	SSVEC	2014	\$1,250,000
SSVEC Sub Total				\$22,380,000
24	Palominas Substation Improvements	APS	2014	\$750,000
25	Don Luis - Mural 69 kV Upgrade	APS	2014	\$1,900,000
26	Boothill Substation Improvements	APS	2014	\$8,850,000
APS Sub Total				\$11,500,000
32	San Rafael 1-69 kV Breakers & Cap. (19.2 MVar)*	SWTC	2014	\$600,000
SWTC Sub Total				\$600,000
2014 TOTAL				\$34,480,000
* New project identified since June 2011 ACC filing.				

TABLE 1B: 2021 In-Service Date Projects

Cochise County Study Group 2021 In Service Date Projects				
Project ID	Description of Construction Element	Entity	In-service year	2011 Estimated Cost
1	Kartchner-Buffalo Soldier 69 kV New	SSVEC	2021	\$13,850,000
3	Ft. Huachuca -Buffalo Soldier UG 69 kV Line	SSVEC	2021	\$4,000,000
SSVEC Sub Total				\$17,850,000
28	San Rafeal Substation Improvements	SWTC	2021	\$3,670,910
SWTC Sub Total				\$3,670,910
29	Ft. Huachuca Substation Improvements	TEP	2021	\$6,750,000
TEP Sub Total				\$6,750,000
2021 TOTAL				\$28,270,910

TABLE 1C: Beyond 2021 In-Service Date Projects

Cochise County Study Group Beyond 2021 In Service Date Projects				
Project ID	Description of Construction Element	Entity	In-service year	2011 Estimated Cost
4	Webb Substation Improvements	SSVEC	beyond 2021	\$5,250,000
5	Ramsey 69 kV Sectionalizing Breaker	SSVEC	beyond 2021	\$550,000
7	San Rafeal - Ramsey 69 kV Line Rebuild	SSVEC	beyond 2021	\$3,968,000
8	Hawes 2-69 kV Sectionalizing Breakers	SSVEC	beyond 2021	\$1,000,000
11	Bella Vista 69 kV GOAB to Double Circuit 69 kV	SSVEC	beyond 2021	\$100,000
12	Bella Vista 2-69 kV Sectionalizing Breakers	SSVEC	beyond 2021	\$1,050,000
13	Bella Vista single circuit 69 kV to Double Circuit	SSVEC	beyond 2021	\$512,000
14	New San Rafeal to Charleston Jct 69 kV Line	SSVEC	beyond 2021	\$5,331,000
15	Charleston Jct to Tombstone Jct 69 kV Rebuild	SSVEC	beyond 2021	\$12,062,000
17	Kansas Settlement - Chiricahua 69 kV Line Rebuild	SSVEC	beyond 2021	\$9,680,000
18	Replace Chiricahua with Sunizona Substation	SSVEC	beyond 2021	\$500,000
20	2018 Webb 1-69 kV Breaker & Cap (6 MVAR)	SSVEC	beyond 2021	\$500,000
22	Benson 1- 69 kV Breaker & Capacitor (8 MVAR)	SSVEC	beyond 2021	\$550,000
SSVEC Sub Total				\$41,053,000
23	San Pedro Substation Improvements	APS	beyond 2021	\$1,575,000
APS Sub Total				\$1,575,000
27	Kartchner Substation Improvements	SWTC	beyond 2021	\$696,093
SWTC Sub Total				\$696,093
Beyond 2021 Total				\$43,324,093

ATTACHMENT A
TECHNICAL STUDY REPORT

EXECUTIVE SUMMARY

Introduction

On June 30, 2011, the Cochise County Study Group (CCSG) submitted a Cochise County facility study report to the Arizona Corporation Commission (ACC) to comply with the ACC's order #72031, requesting the CCSG to identify transmission facilities needed to meet Cochise County load serving needs safely and reliably in the shortest time frame. The ACC order also required the CCSG to submit a progress report of the plan of service identified in the facility study by September 30, 2011. This report is intended to comply with that requirement.

To meet the requirements of the September 30, 2011 filing under ACC order #72031, the CCSG contracted with PDS Consulting, PLC (PDS) to perform the technical analysis to identify the components of the plan of service contained in the Cochise County facility study report needed to meet Cochise County forecasted load serving needs for the years 2014 and 2021. With CCSG members' assistance, PDS performed the requested technical analysis using Western Electricity Coordinating Council (WECC) approved 2014 and 2021 heavy summer power flow models. These power flow models were subsequently reviewed and approved by CCSG members to meet the loads and resource requirements for the respective time frame. In this study, only power flow analysis was conducted to ensure that the CCSG loads would be served in a reliable manner.

Recommendation

For the initial phase of improvements, 69 kV circuits may be operated as normally open and may be closed during a transmission outage. The initial phase is part of a flexible, long range strategy to make continuous improvements to the load serving capability of the 69kV system and provide continuity of service to the region.

The analysis in this report shows the need for shunt capacitors at certain 69kV substations. The size and location of the recommended 69kV shunt capacitors may be revised as additional detailed studies are performed by the load serving entities in the area. Additional detailed capacitor studies may show a different capacitor requirement based on power factor, distribution facilities compensation, etc. as well as more optimum location(s) to minimize costs and still achieve the acceptable voltage levels under normal and emergency conditions.

The study described in this report identified the following new and upgraded subtransmission and transmission facilities that will be required to ensure that Cochise County projected load serving needs at 294 MW in 2014 are reliably met:

- New Hereford - Palominas 69 kV tie
- New substation at Boothill with a new 50 MVA, 115/69kV transformer
- Loop Webb - Tombstone Jct 69 kV line through Boothill
- Upgrade Webb - Tombstone Jct 69 kV line (795 ACSR)
- New shunt capacitors at the following substations

- Two (2) 14.4 MVar at Benson 69 kV substation
- 13.2 MVar at Webb 69 kV substation
- 19.2 MVar at San Rafael 69 kV substation
- 8 MVar at Ramsey 69 kV substation
- 8 MVar at Hawes 69 kV substation
- 8 MVar at Pueblo 69 kV substation
- 8 MVar at Huachuca 69 kV substation
- The following normally open transmission circuits were modeled as normally closed circuits to evaluate the load serving capabilities under N-1 conditions:
 - Webb - Tombstone Jct 69 kV line
 - Charleston Jct - Bella Vista Tap 69 kV line
 - Keating Junction - Hawes 69 kV line
 - Tombstone Jct - Huachuca Junction 69 kV line
 - McNeal-San Pedro 69 kV Line

Additional new facilities and new operating procedures will be required to continue to serve the 2021 forecasted loads of 302 MW in Cochise County. A second 230/69 kV transformer at San Rafael and the existing 18 MVar shunt capacitor switched in-service at Kartchner 69 kV (as well as the 14MVar capacitor) are required. To mitigate the overloading concern identified on the Adams - Boothill 115 kV line following the outage of the Butterfield -San Rafael 230 kV line, an operating procedure that includes operating the Fairview 16MW diesel generator will be required.

Presently, up to 18 MW in the winter and 16 MW in the summer is provided to Fort Huachuca through an automatic transfer scheme via a 46 kV sub-transmission line connected to the TEP 138kV bus at the South Loop substation. Approximately 3.9 MW of Fort Huachuca capacity is potentially available by uninterruptible power supply (UPS) and back-up emergency generation. Fort Huachuca has a historical peak summer load of 25 MW and would be required to shed non-critical loads until the 138 kV restoration is complete¹.

The Kartchner - Buffalo Soldier 69 kV tie will be operated normally open, and is proposed to be a second back-up, or a third source to Fort Huachuca. It is intended that this second backup, in combination with the 46 kV backup, could provide full capacity to Fort Huachuca.

The proposed Fort Huachuca - Buffalo Soldier 69 kV tie is to be operated normally open. As part of this project a new 138/69 kV transformer would need to be added near the Fort Huachuca substation. Although this project will be built by TEP it will be paid for by another party. This 69 kV tie requires the Kartchner - Buffalo Soldier 69 kV project to be in service. It is intended to be a back-up to help ensure other Cochise County area loads have continuity of service². This project is also needed to provide additional voltage support in the Sierra Vista area.

¹ This complies with the TEP ACC approved Rules and Regulations for Provision of Service (POS) which includes our existing Continuity of Service (COS) in section 8.

² Continuity of service was defined by CCSG and approved by the ACC in the sixth BTA as follows:

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Loss of any single transmission facility will not result in loss of load that requires subsequent System Operator intervention, either directly or through Energy Management System, to restore service. Specifying without Operator intervention reduces outage time to be within the timeframe that automated schemes typically operate (e.g. seconds to minutes).

INTRODUCTION

On June 30, 2011, the Cochise County Study Group (CCSG) submitted a Cochise County facility study report to the Arizona Corporation Commission (ACC) to comply with the ACC's order #72031, requesting the CCSG to identify transmission facilities needed to meet Cochise County load serving needs safely and reliably in the shortest time frame. The ACC order also required the CCSG to submit a progress report of the plan of service identified in the facility study by September 30, 2011. This report is intended to comply with that requirement.

To meet the requirements of the September 30, 2011 filing under ACC order #72031, the CCSG contracted with PDS Consulting, PLC (PDS) to perform the technical analysis to identify the components of the plan of service contained in the Cochise County facility study report needed to meet Cochise County forecasted load serving needs for the years 2014 and 2021. With CCSG members' assistance, PDS performed the requested technical analysis using Western Electricity Coordinating Council (WECC) approved 2014 and 2021 heavy summer power flow models. These power flow models were subsequently reviewed and approved by CCSG members to meet the loads and resource requirements for the respective time frame. At this time, only power flow analysis was conducted to ensure that the CCSG loads would be served in a reliable manner.

COCHISE COUNTY TRANSMISSION SYTEM

The Cochise County region comprises the southeastern corner of Arizona and is bordered by New Mexico to the east and Mexico to the south. The major cities in the County include Benson, Bisbee, Douglas, Sierra Vista, Tombstone and Willcox. The County also houses a major U.S. military installation, Fort Huachuca, which is located adjacent to the City of Sierra Vista.

Transmission service within Cochise County consists principally of three radial high-voltage transmission (2-115 kV and 1-230 kV) lines, which feed into the underlying sub-transmission systems (46 kV and 69 kV) and a fourth dedicated radial 138 kV line serving Fort Huachuca. Five major electrical utilities have transmission and/or load serving obligations in Cochise County. Sulphur Springs Valley Electric Cooperative (SSVEC) is the major load serving entity in Cochise County and owns most of the sub-transmission infrastructure. Southwest Transmission Cooperative (SWTC) provides transmission service to SSVEC for its Sierra Vista area loads, principally via two radial lines; a 115 kV line from Pantano to Kartchner substations and a 230 kV line from Butterfield to San Rafael substations. SWTC can also provide additional import capacity for SSVEC to serve its Sierra Vista area loads via the Apache substation provided that SSVEC operates their sub-transmission system in a looped configuration. Western Area Power Administration (WAPA) provides transmission service to Arizona Public Service (APS), which then delivers power via a radial 115 kV transmission line from the Adams Tap substation to APS's Mural substation to serve its loads in the south-central and far southeastern corner of Cochise County. Tucson Electric Power (TEP) serves Fort

Huachuca, its retail customer, via a radial 138 kV line which emanates from Vail substation. Presently, an alternative path for delivering up to 18 MW for backup service to Fort Huachuca, through an automatic transfer scheme, is provided by a TEP 46 kV sub-transmission line connected to the TEP 138 kV bus at the South Loop substation. TEP has rights on the SWTC system to provide a second backup service in the amount of 50 MW for Fort Huachuca, delivered at SWTC's option of either the Kartchner or San Rafael Substations. Mutual agreement between SWTC and TEP will be required to provide the service to Kartchner, in the event a decision is made to construct the proposed Kartchner to Buffalo Soldiers 69 kV project.

This second back-up service is available with the understanding that the cost of a second back-up or third source to be used under emergency conditions such as an interconnection between SWTC's Kartchner Substations and the Buffalo Soldier's Substation will be the responsibility of Fort Huachuca.

Figure 1 provides a graphical depiction of Cochise County's transmission system and service areas.

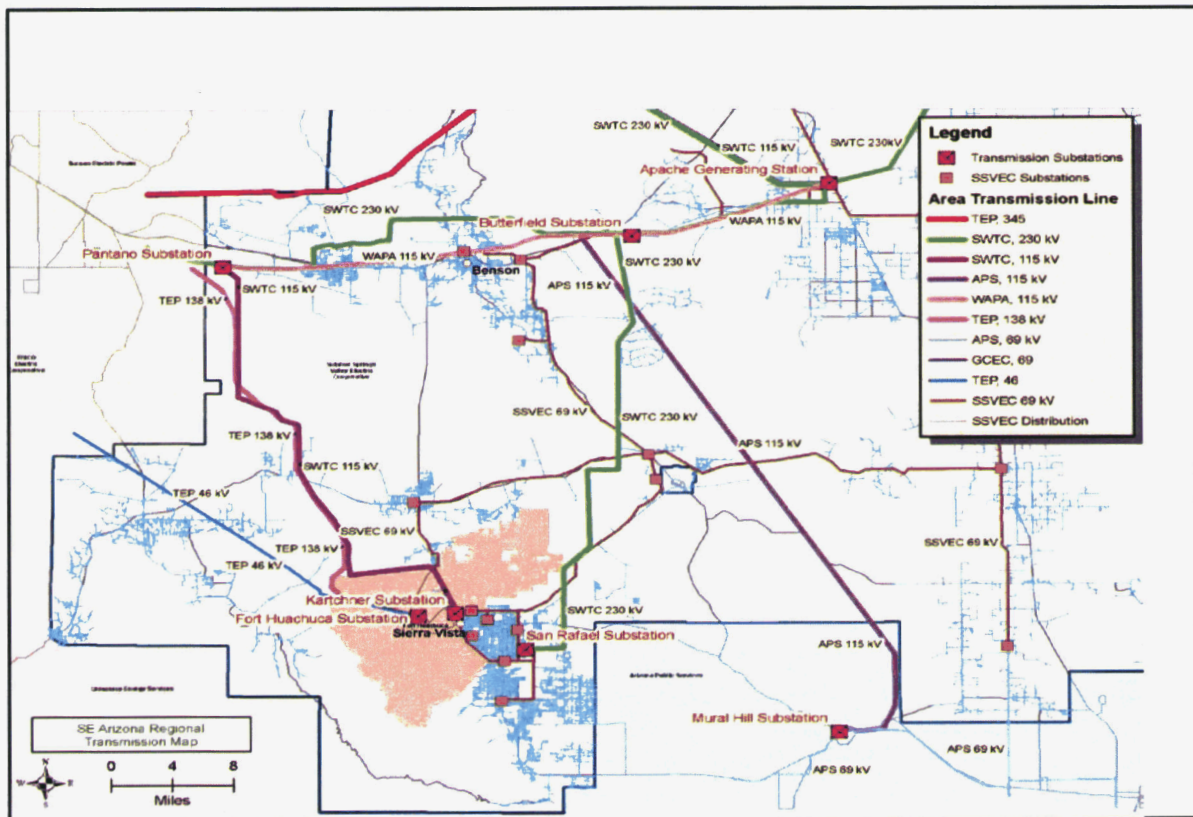


Figure 1: Cochise County Transmission System

FACILITIES IDENTIFIED IN FACILITY STUDY REPORT

The following transmission facilities were identified in the CCSG June 30, 2011 Facility Study report submitted to the ACC. The scope of this study is to identify the components of the facilities listed below and any additional recommended infrastructure required to meet Cochise County area load requirements for the years 2014 and 2021 based on most recent revised load forecast.

- New Kartchner - Buffalo Soldier 69 kV line
- New Hereford - Palominas 69 kV tie
- New Fort. Huachuca - Buffalo Soldier UG 69 kV line
- San Rafael - Ramsey 69 kV line rebuild
- New San Rafael - Charleston Jct. 69 kV line
- Charleston Jct. - Tombstone Jct. 69 kV line rebuild
- Webb - Tombstone Jct. 69 kV line rebuild
- Kansas Settlement - Chiricahua 69 kV line rebuild
- Loop Webb - Tombstone Jct 69 kV line through Boothill
- New 8 MVAR shunt capacitor at Ramsey 69 kV
- New 8 MVAR shunt capacitor at Hawes 69 kV
- New 8 MVAR shunt capacitor at Benson 69 kV
- New 13.2 MVAR shunt capacitor at Webb 69 kV

STUDY BASE CASE DESCRIPTION AND METHODOLOGY

This technical analysis was conducted using approved WECC 2014 heavy summer and 2021 heavy summer models. Both power flow base cases were reviewed by the CCSG to ensure that the modeled demand reflects the most recent loads forecasted for 2014 (294 MW) and 2021 (302 MW) heavy summer operating conditions in Cochise County.

This 2014 base model served as a benchmark base case for the initial power flow analysis. Arizona Public Service's (APS) planned Don Luis - Mural 69 kV line upgrade was modeled in the benchmark case. The results of the power flow analysis were evaluated using the performance evaluation criteria described in the Performance Evaluation Criteria section below. Subtransmission and transmission components identified in the Cochise County facility report were added to the benchmark base model when performance criteria violations were found following the power flow analysis. This was done until acceptable system performance was achieved. New facilities are recommended if they are found to be more effective in mitigating a performance criteria violation than a facility listed in the initial facility report. This base case is referred to as 2014 Upgrade Model.

The recommended subtransmission and transmission plan from the 2014 Upgrade Model was incorporated into the 2021 base model. Power flow analysis was performed on this model to ensure Cochise County 2021 load serving needs are met safely and reliably.

The Cochise County electric transmission system was evaluated for performance criteria violation under normal operating conditions (N-0) and single element outage (N-1) conditions. The outages simulated included:

- All single 69 kV and above transmission circuit outages within Cochise County or those that impact the Cochise County area sub-transmission system.
- All single transformer outages within Cochise County, excluding transformers serving only distribution load (N-1).
- All single 69 kV and above import transmission lines into Cochise County.

PERFORMANCE EVALUATION CRITERIA

The WECC/NERC reliability standards were used to assess the adequacy of the study results for both the transmission and sub-transmission systems. The related power flow analysis evaluation criteria used included:

- Pre-contingency: Buses with voltages 69 kV and above must be between 0.95 per unit and 1.05 per unit.
- Maximum voltage deviation allowed at all buses under single element contingency conditions will be (+/-) 5%.
- Pre-disturbance loading to remain within continuous ratings of all equipment and line conductors
- Post-disturbance loading to remain within emergency ratings of all equipment and line conductors.

Other performance evaluation criteria include:

- Following an outage of a transmission facility 115 kV and above would require Continuity of Service in Cochise County.
- Manual operating procedures for this analysis are not to be utilized as a mitigation plan for contingencies that cause flows in excess of transmission facility emergency ratings.

STUDY RESULTS

2014 Base Model

A power flow map with all transmission lines in service for the Base Model is depicted in Appendix A, Figure A-1. Summary of the power flow analysis using the 2014 base model is provided in Appendix B, Table B-1. Key findings from the power flow analysis are:

- No subtransmission or transmission facility overload was identified under normal and/or outage conditions.
- The system configuration of Cochise County is the area loads are served from four radial HV transmission lines. An outage of one of these four radial transmission lines or a transformer will initially produce a non-solve power flow solution due to the islanded loads in several instances. The four outages are Adams - Boothill 115 kV line, Butterfield - San Rafael 230 kV line, Kartchner 115/69 kV transformer outage and the Vail - Fort Huachuca 138 kV line. To analyze the transmission system, existing manual operating procedures were implemented and the results are as follows:
 - Adams - Boothill 115 kV line outage: Power was restored to the area affected by this outage by operating APS' 16 MW diesel powered generator and closing a normally open 69 kV line between McNeal and San Pedro.
 - Kartchner 115/69 kV transformer outage: Power was restored to the area served by this transmission line by closing the following normally open circuits: Keating Junction - Hawes 69 kV line and Bella Vista - Charleston Jct 69 kV line.
 - Vail - Fort Huachuca 138 kV line outage: Presently, up to 18 MW in the winter and 16 MW in the summer is provided to Fort Huachuca through an automatic transfer scheme via a 46 kV sub-transmission line connected to the TEP 138 kV bus at the South Loop substation. Approximately 3.9 MW of Fort Huachuca capacity is potentially available by uninterruptible power supply (UPS) and back-up emergency generation. Fort Huachuca has a historical peak summer load of 25MW and would be required to shed non-critical loads until the 138kV restoration is complete.
- Restoring power to the areas affected by the outage of the Butterfield - San Rafael 230 kV line at 2014 heavy summer peak load levels was not feasible even after implementing the existing manual operating procedures noted above. Therefore, the existing transmission system needs new subtransmission and transmission facilities to be added to ensure reliable service following this outage, as discussed in the next section.
- Voltage deviation violations were identified following selected outages. Appendix B, Table B-2 provides a summary of the identified voltage violations.

2014 Upgrade Model

To ensure that Cochise County projected load serving needs are met safely and reliably in 2014 the following subtransmission and transmission facilities were added to the base model:

- New Hereford - Palominas 69 kV tie
- New 115/69 kV substation at Boothill
- New 50 MVA, 115/69 kV transformer at Boothill
- Loop Webb - Tombstone Jct 69 kV line through Boothill
- Upgrade Webb - Tombstone Jct 69 kV line (795 ACSR)
- New shunt capacitors at the following substations
 - Two (2) 14.4 MVar at Benson 69 kV substation
 - 13.2 MVar at Webb 69 kV substation
 - 19.2 MVar at San Rafael 69 kV substation
 - 8 MVar at Ramsey 69 kV substation
 - 8 MVar at Hawes 69 kV substation
 - 8 MVar at Pueblo 69 kV substation
 - 8 MVar at Huachuca 69 kV substation

The following normally open transmission circuits were modeled as normally closed circuits to evaluate load serving capabilities under N-1 conditions:

- Webb - Tombstone Jct 69 kV line
- Charleston Jct - Bella Vista Tap 69 kV line
- Keating Junction - Hawes 69 kV line
- Tombstone Jct - Huachuca Junction 69 kV line
- McNeal-San Pedro 69 kV Line

Power flow maps with all transmission lines in service and under critical outage conditions for the 2014 Upgrade Model are provided in Appendix A. Summary of the power flow analysis is provided in Appendix B, Table B-3.

Key findings from the power flow analysis using the 2014 Upgrade Model are:

- No transmission facility overload was identified under normal and/or outage operating conditions. However, for the outage of the radial Vail - Fort Huachuca 138 kV line, implementing the existing operating procedure would allow Fort Huachuca to restore up to 18 MW of power through an automatic transfer scheme via the 46 kV line.
- No voltage deviation violation was identified.

2021 Base Model

The upgrade projects recommended for 2014 were included in the 2021 base model. Power flow maps with all transmission lines in service and under critical outage conditions for the 2021 Upgrade model are provided in Appendix A. A summary of the power flow analysis results is provided in Appendix B, Table B-4. The key findings from the power flow analysis using this model are:

- No subtransmission or transmission facility overload was identified under normal operating (N-0) conditions.
- Two transmission facilities were overloaded following selected single element outages (N-1). The overloaded facilities include:
 - San Rafael 230/69 kV transformer loads up to 105% of the transformer's short-term rating following loss of the Pantano - Kartchner 115 kV line. This overload is mitigated by installing a second 230/69 kV transformer at San Rafael.
 - Adams Tap - Boothill 115 kV line loads to 104% of its emergency rating following an outage of Butterfield - San Rafael 230 kV line. To mitigate this overload, an operating procedure will be required to switch the Fairview diesel generator into operation following the outage of the Butterfield - San Rafael 230 kV line.
- Presently, up to 18 MW in the winter and 16 MW in the summer is provided to Fort Huachuca through an automatic transfer scheme via a 46 kV subtransmission line connected to the TEP 138kV bus at the South Loop substation. Approximately 3.9 MW of Fort Huachuca capacity is potentially available by uninterruptible power supply (UPS) and back-up emergency generation. Fort Huachuca has a historical peak summer load of 25 MW and would be required to shed non-critical loads until the 138 kV restoration is complete³.

The Kartchner - Buffalo Soldier 69 kV tie will be operated normally open, and is proposed to be a second back-up or a third source to Fort Huachuca. It is intended that this second backup, in combination with the 46 kV backup, could provide full capacity to Fort Huachuca.

The proposed Fort Huachuca - Buffalo Soldier 69 kV tie is to be operated normally open. As part of this project a new 138/69 kV transformer would need to be added near the Fort Huachuca substation. Although this project will be built by TEP it will be paid for by another party. This 69 kV tie requires the Kartchner - Buffalo Soldier 69 kV project to be in service. It is intended to be a back-up to help ensure other Cochise County area loads have continuity of service⁴. This project is also needed to provide additional voltage support in the Sierra Vista area.

³ This complies with the TEP ACC approved Rules and Regulations for Provision of Service which includes our existing Continuity of Service in section 8.

⁴ Continuity of service was defined by CCSG and approved by the ACC in the sixth BTA as follows:

Loss of any single transmission facility will not result in loss of load that requires subsequent System Operator intervention, either directly or through Energy Management System, to restore service. Specifying without Operator intervention reduces outage time to be within the timeframe that automated schemes typically operate (e.g. seconds to minutes).

- Voltage deviation violations were identified following selected outages. Appendix B, Table B-5 provides a summary of the identified voltage deviation violations. These violations are mitigated by switching in the existing 18 MVAR shunt capacitor at the Kartchner 69 kV substation.

RECOMMENDATION

For the initial phase of improvements, 69 kV circuits may be operated as normally open and may be closed during a transmission outage. The initial phase is part of a flexible, long range strategy to make continuous improvements to the load serving capability of the 69kV system and provide continuity of service to the region.

The analysis in this report shows the need for shunt capacitors at certain 69kV substations. The size and location of the recommended 69kV shunt capacitors may be revised as additional detailed studies are performed by the load serving entities in the area. Additional detailed capacitor studies may show a different capacitor requirement based on power factor, distribution facilities compensation, etc. as well as more optimum location(s) to minimize costs and still achieve the acceptable voltage levels under normal and emergency conditions.

The study described in this report identified the following new and upgraded subtransmission and transmission facilities that will be required to ensure that Cochise County projected load serving needs at 294 MW in 2014 are reliably met:

- New Hereford - Palominas 69 kV tie
- New substation at Boothill with a new 50 MVA, 115/69kV transformer
- Loop Webb - Tombstone Jct 69 kV line through Boothill
- Upgrade Webb - Tombstone Jct 69 kV line (795 ACSR)
- New shunt capacitors at the following substations
 - Two (2) 14.4 MVAR at Benson 69 kV substation
 - 13.2 MVAR at Webb 69 kV substation
 - 19.2 MVAR at San Rafael 69 kV substation
 - 8 MVAR at Ramsey 69 kV substation
 - 8 MVAR at Hawes 69 kV substation
 - 8 MVAR at Pueblo 69 kV substation
 - 8 MVAR at Huachuca 69 kV substation
- The following normally open transmission circuits were modeled as normally closed circuits to evaluate load serving capabilities under N-1 conditions:
 - Webb - Tombstone Jct 69 kV line
 - Charleston Jct - Bella Vista Tap 69 kV line
 - Keating Junction - Hawes 69 kV line
 - Tombstone Jct - Huachuca Junction 69 kV line
 - McNeal-San Pedro 69 kV Line

Additional new facilities and new operating procedures will be required in order to continue to serve the 2021 forecasted loads of 302 MW in Cochise County. A second 230/69 kV transformer at San Rafael and the existing 18 MVAR shunt capacitor switched in-service at Kartchner 69 kV (as well as the 14MVAR capacitor). To mitigate the overloading concern identified on the Adams - Boothill 115 kV line following the outage of the Butterfield -San Rafael 230 kV line, an operating procedure that include operating the Fairview 16MW diesel generator will be required.

Presently, up to 18 MW in the winter and 16 MW in the summer is provided to Fort Huachuca through an automatic transfer scheme via a 46 kV sub-transmission line connected to the TEP 138kV bus at the South Loop substation. Approximately 3.9 MW of Fort Huachuca capacity is potentially available by uninterruptible power supply (UPS) and back-up emergency generation. Fort Huachuca has a historical peak summer load of 25 MW and would be required to shed non-critical loads until the 138 kV restoration is complete⁵.

The Kartchner - Buffalo Soldier 69 kV tie will be operated normally open, and is proposed to be a second back-up or a third source to Fort Huachuca. It is intended that this second backup, in combination with the 46 kV backup, could provide full capacity to Fort Huachuca.

The proposed Fort Huachuca - Buffalo Soldier 69 kV tie is to be operated normally open. As part of this project a new 138/69 kV transformer would need to be added near the Ft. Huachuca substation. Although this project will be built by TEP it will be paid for by another party. This 69 kV tie requires the Kartchner - Buffalo Soldier 69 kV project to be in service. It is intended to be a back-up to help ensure other Cochise County area loads have continuity of service⁶. This project is also needed to provide additional voltage support in the Sierra Vista area..

⁵ This complies with the TEP ACC approved Rules and Regulations for Provision of Service (POS) which includes our existing Continuity of Service in section 8.

⁶ Continuity of service was defined by CCSG and approved by the ACC in the sixth BTA as follows:

Loss of any single transmission facility will not result in loss of load that requires subsequent System Operator intervention, either directly or through Energy Management System, to restore service. Specifying without Operator intervention reduces outage time to be within the timeframe that automated schemes typically operate (e.g. seconds to minutes).

APPENDIX A: Power Flow Maps

Figure A-1: Power Flow Map – 2014 Base Model (All lines-in-service)

Figure A-2: Power Flow Map –2014 Upgrade Model (All lines-in-service)

Figure A-3: Power Flow Map – 2014 Upgrade Model (Butterfield- San Rafael 230 kV line outage)

Figure A-4: Power Flow Map – 2014 Upgrade Model (Kartchner 115/69 kV transformer outage)

Figure A-5: Power Flow Map – 2014 Upgrade Model (Adams-Boothill 115 kV line outage)

Figure A-6: Power Flow Map – 2021 Base Model (All lines-in-service)

Figure A-7: Power Flow Map – 2021 Base Model Case 6 (Butterfield- San Rafael 230 kV line outage)

Figure A-8: Power Flow Map – 2021 Base Model (Kartchner 115/69 kV transformer outage)

Figure A-9: Power Flow Map – 2021 Base Model (Adams- Boothill 115 kV line outage)

Figure A-1: Power Flow Map – 2014 Base Model (All lines-in-service)

Figure A-2: Power Flow Map –2014 Upgrade Model (All lines-in-service)

Figure A-3: Power Flow Map – 2014 Upgrade Model (Butterfield- San Rafael 230 kV line outage)

Figure A-4: Power Flow Map – 2014 Upgrade Model (Kartchner 115/69 kV transformer outage)

Figure A-5: Power Flow Map – 2014 Upgrade Model (Adams-Boothill 115 kV line outage)

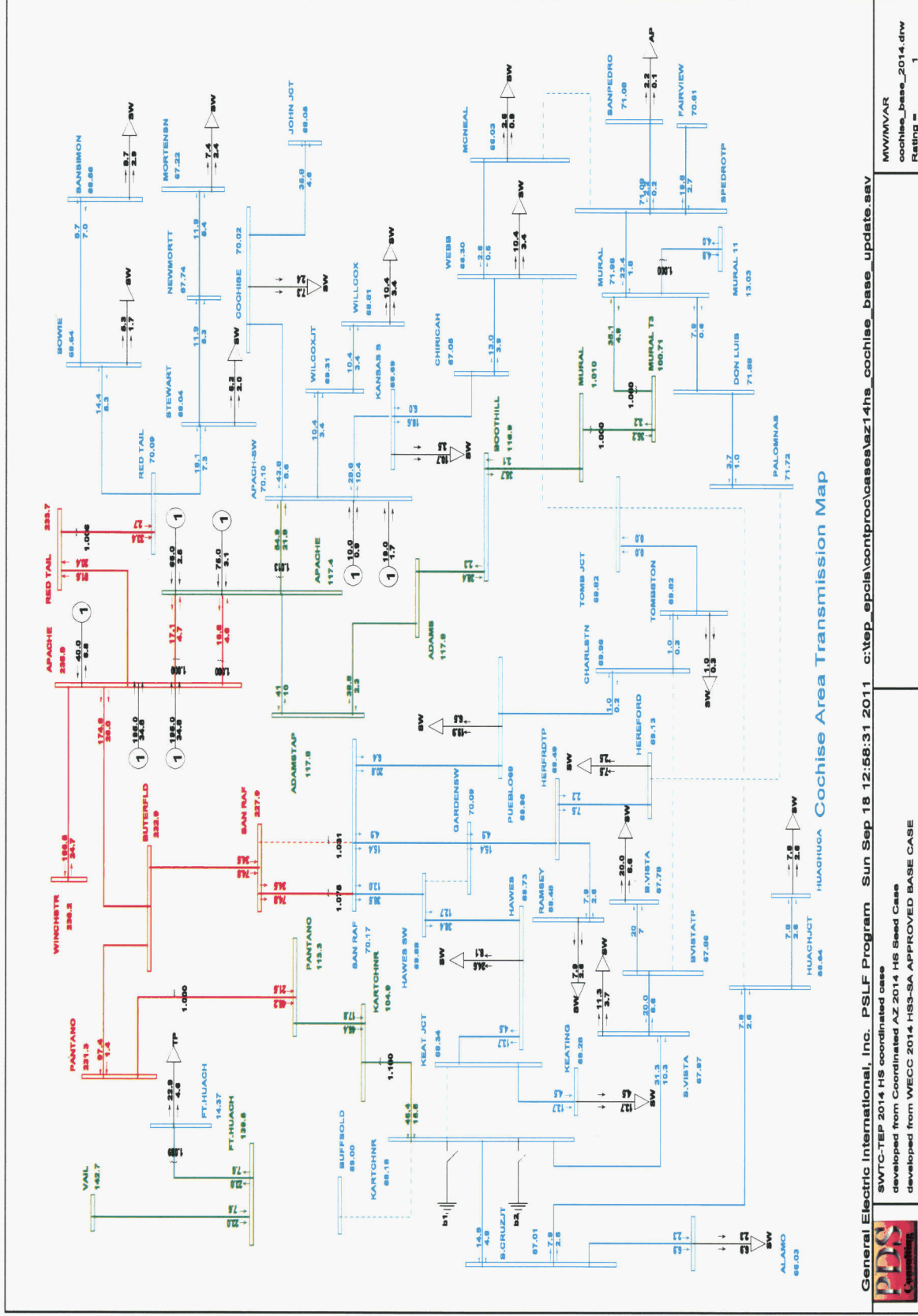
Figure A-6: Power Flow Map – 2021 Base Model (All lines-in-service)

Figure A-7: Power Flow Map – 2021 Base Model Case 6 (Butterfield- San Rafael 230 kV line outage)

Figure A-8: Power Flow Map – 2021 Base Model (Kartchner 115/69 kV transformer outage)

Figure A-9: Power Flow Map – 2021 Base Model (Adams- Boothill 115 kV line outage)

Figure A-1: Power Flow Map – 2014 Base Model (All lines-in-service)

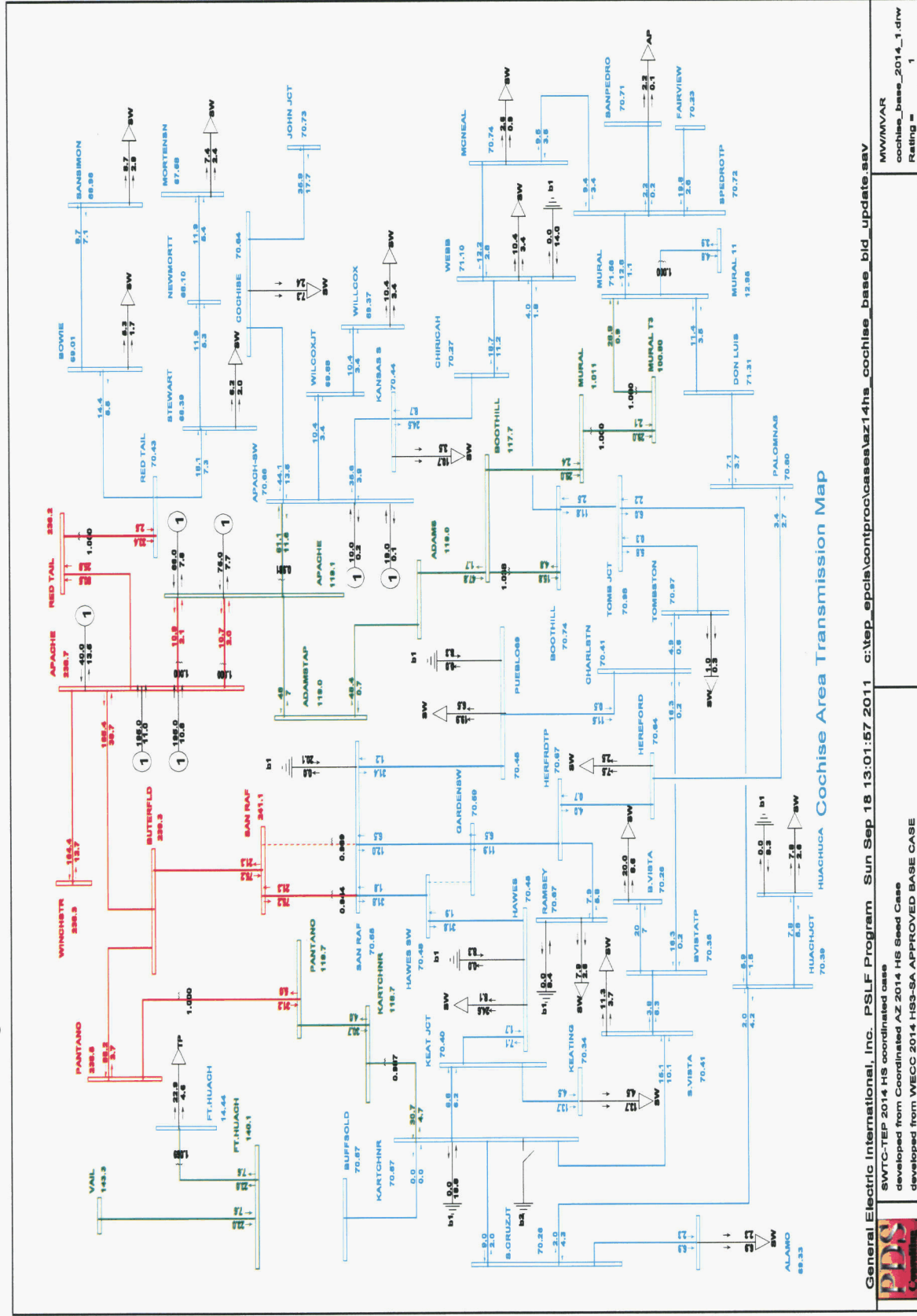


General Electric International, Inc. PSLEF Program Sun Sep 18 12:59:31 2011 c:\top_epcis\contproc\cases\az14hs_cochise_base_update.sav

SWTC-TEP 2014 HS coordinated case
developed from Coordinated AZ 2014 HS Seed Case
developed from WECC 2014 HS-SA APPROVED BASE CASE

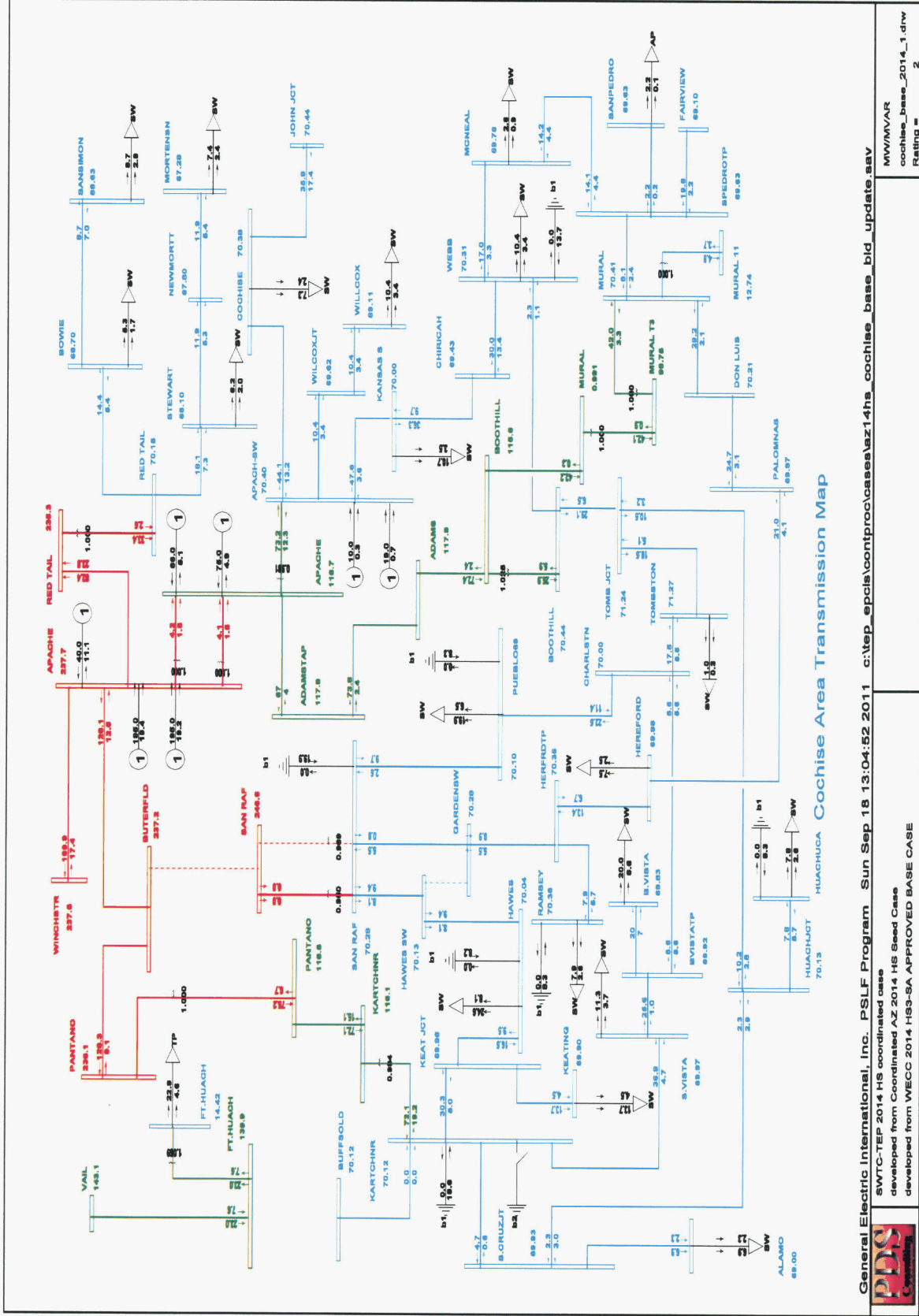
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cochise_base_2014.drw
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Figure A-2: Power Flow Map –2014 Upgrade Model (All lines-in-service)



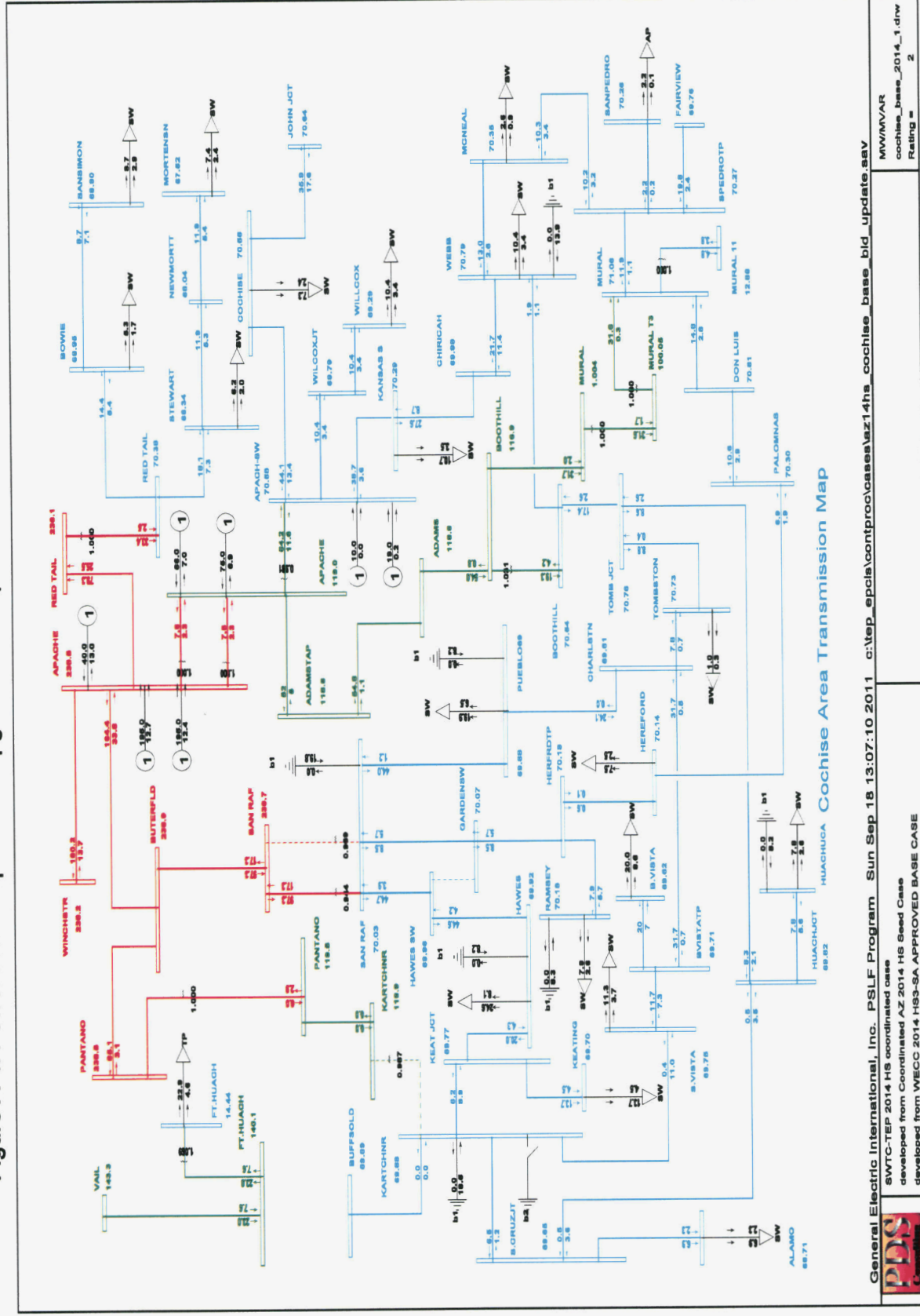
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Figure A-3: Power Flow Map – 2014 Upgrade Model (Butterfield-San Rafael 230 kV line outage)



<p>General Electric International, Inc. PSLF Program Sun Sep 18 13:04:52 2011 c:\epc\control\cases\az14hs_cochise_base_bld_update.sav</p>	<p>SWTC-TEP 2014 HS coordinated case developed from Coordinated AZ 2014 HS Seed Case developed from WECC 2014 H33-SA APPROVED BASE CASE</p>
<p>MW/MVAR cochise_base_2014_1.drw Rating = 2</p>	<p>18</p>

Figure A-4: Power Flow Map – 2014 Upgrade Model (Kartchner 115/69 kV transformer outage)



General Electric International, Inc. PS&F Program Sun Sep 18 13:09:46 2011 c:\epc\contproc\case\az14hs_cochise_base_bid_update.sav
 SWTC-TEP 2014 HS coordinated case
 developed from Coordinated AZ 2014 HS Seed Case
 developed from WECC 2014 HSS-SA APPROVED BASE CASE

MW/MVAR
 cochise_base_2014_1.drw
 Rating =

General Electric International, Inc. PSLF Program Sun Sep 18 13:14:56 2011 c:\top_epc\contproc\cases\az21hs_cochi_base bid update1.sav

Coordinated AZ 2021HS Seed Case
Developed from WECC 2021 HS1A APPROVED BASE CASE
AZ Detail Model added 1/25/11 - 3/11/11

MMW/MAR
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Rating = 1

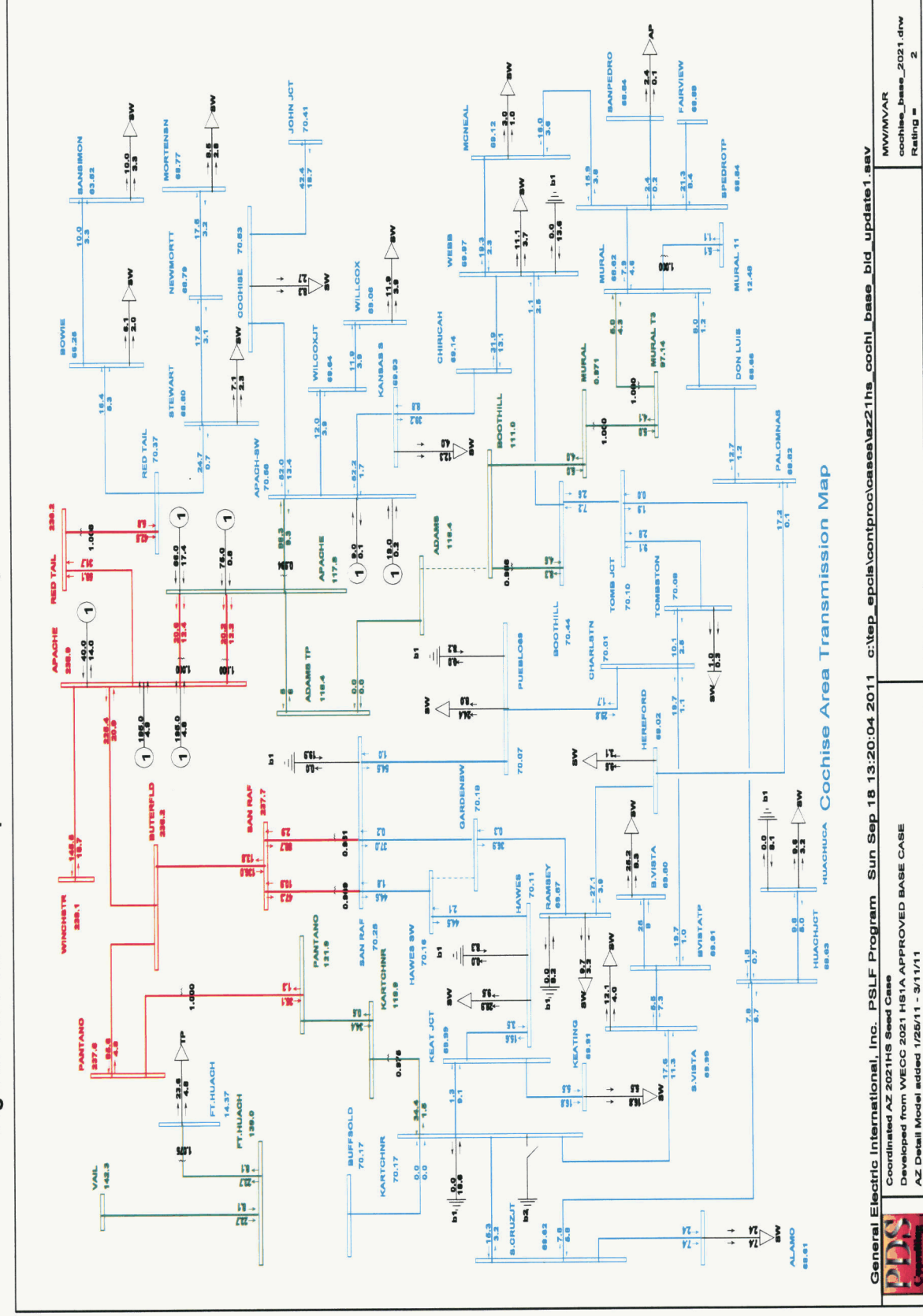
General Electric International, Inc. PSLF Program Sun Sep 18 13:14:56 2011 c:\top_epc\contproc\cases\az21hs_cochi_base bid update1.sav

Coordinated AZ 2021HS Seed Case
Developed from WECC 2021 HS1A APPROVED BASE CASE
AZ Detail Model added 1/25/11 - 3/11/11

MMW/MAR
cochise_base_2021.drw
Rating = 1

[illegible]

Figure A-9: Power Flow Map – 2021 Base Model (Adams-Boothill 115 kV line outage)



APPENDIX B: Summary of Power Flow Study Results

Table B-1: Summary of Power Flow Results-- 2014 Base Model

Outage Element (s)	Overloaded Facility	Applicable Rating	Loading (%)	Comments
Category A--Normal Overloads				
ALL LINES IN SERVICE	NONE	N/A	N/A	None.
Category B Outages				
BUTTERFIELD - SAN RAFAEL 230 KV LINE	NONE	N/A	N/A	No power flow solution.
KARTCHNER#1 115/69 KV TRANSFORMER	NONE	N/A	N/A	No power flow solution. Solution achieved after implementing manual operating procedure.
ADAMS - BOOTHILL 115 KV LINE	NONE	N/A	N/A	No power flow solution. Solution achieved by closing McNeal-San Pedro 69kV tie and/or turning on the Fairview generation
VAIL - FT. HUACHUCA 138 KV LINE	NONE	N/A	N/A	No power flow solution. Solution restores partial power with automatic transfer scheme.

Table B-2: Summary of Power Flow Results-- 2014 Base Model

Outage Element (s)	Bus Name	Voltage Deviation (%)
Category A--Normal Overloads		
ALL LINES IN SERVICE	NONE	None.
Category B Outages		
BUTTERFIELD - APACHE 230 KV LINE	BUTERFLD 230 KV	5.64
	SAN RAF 230 KV	5.93
	KARTCHNR 230 KV	5.51
	ALAMO 69 KV	6.03
	B. VISTA 69 KV	5.72
	CHALRSTN 69 KV	6.17
	GARDENSW 69 KV	6.14
	HAWES 69 KV	6.21
	HEREFORD 69 KV	6.28
	HUACHUCA 69 KV	6.92
	KARTCHNR 69 KV	5.66
	KEATING 69 KV	6.29
	PUEBLO69 69 KV	6.16
	RAMSEY 69 KV	6.22
	S. VISTA 69 KV	5.69
	SAN RAF 69 KV	6.13
	TOMSTONE 69 KV	6.18

Table B-3: Power Flow Map— 2014 Upgrade Model

Outage Element (s)	Overloaded Facility	Applicable Rating	Loading (%)	Comments
Category A—Normal Overloads				
ALL LINES IN SERVICE	NONE	N/A	N/A	See recommended modeled projects in the 2014 Upgrade base case
Category B Outages				
VAIL - FT. HUACHUCA 138 KV LINE	NONE	N/A	N/A	No power flow solution. Solution restores partial power with automatic transfer scheme.

Table B-4: Summary of Power Flow Results— 2021 Base Model

Outage Element (s)	Overloaded Facility	Applicable Rating	Loading (%)	Comments
Category A—Normal Overloads				
ALL LINES IN SERVICE	NONE	N/A	N/A	None
Category B Outages				
BUTTERFIELD - SAN RAFAEL 230 KV LINE	ADAMS - BOOTHILL 115 KV LINE	402 A	104%	Run Fairview generator following this outage.
PANTANO - KARTCHNER 115 KV LINE	BUTTERFIELD - SAN RAFAEL 230 KV LINE	112 MVA	105%	Install a second 230/69 kV transformer at San Rafael
VAIL - FT. HUACHUCA 138 KV LINE	NONE	N/A	N/A	No power flow solution. Solution restores partial power with automatic transfer scheme.

Table B-5: Summary of Power Flow Results-- 2021 Base Model

Outage Element (s)	Bus Name	Voltage Deviation (%)
Category A--Normal Overloads		
ALL LINES IN SERVICE	NONE	None.
Category B Outages		
APACH-SW - KANSAS S 69 KV LINE	KANSAS S 69 KV	5.69
KARTCHNR - CRUZJT 69 KV LINE	ALAMO 69 KV	5.66
	HUACHUCA 69 KV	5.06
	S. CRUZJT 69 KV	5.49
	HEREFORD 69 KV	5.20
BUTTERFLD - SAN RAF 230 KV LINE	KARTCHNR 115 KV	5.71
	PALOMINAS 69 KV	5.27
	DON LUIS 69 KV	5.23
	FAIRVIEW 69 KV	5.31
	MURAL 69 KV	5.07
	SANPEDRO 69 KV	5.04

APPENDIX C: Contingency List

CATEGORY A
 RUN 0
 CATEGORY BN
 LINE 17000 "APACH-SW" 69.0 17507 "COCHISE " 69.0 1
 RUN 1
 CATEGORY BN
 LINE 17000 "APACH-SW" 69.0 17517 "KANSAS S" 69.0 1
 RUN 2
 CATEGORY BN
 LINE 17000 "APACH-SW" 69.0 17535 "WILCOXJT" 69.0 1
 RUN 3
 CATEGORY BN
 LINE 17038 "KARTCHNR" 69.0 17540 "BUFFSOLD" 69.0 1
 RUN 4
 CATEGORY BN
 LINE 17038 "KARTCHNR" 69.0 17518 "KEAT JCT" 69.0 1
 RUN 5
 CATEGORY BN
 LINE 17038 "KARTCHNR" 69.0 17528 "S.VISTA " 69.0 1
 RUN 6
 CATEGORY BN
 LINE 17038 "KARTCHNR" 69.0 17556 "S.CRUIZJT" 69.0 1
 RUN 7
 CATEGORY BN
 LINE 17049 "RED TAIL" 69.0 17503 "BOWIE " 69.0 1
 RUN 8
 CATEGORY BN
 LINE 17049 "RED TAIL" 69.0 17531 "STEWART " 69.0 1
 RUN 9
 CATEGORY BN
 LINE 17052 "SAN RAF " 69.0 17524 "PUEBLO69" 69.0 1
 RUN 10
 CATEGORY BN
 LINE 17052 "SAN RAF " 69.0 17526 "HAWES SW" 69.0 1
 RUN 11
 CATEGORY BN
 LINE 17052 "SAN RAF " 69.0 17527 "GARDENSW" 69.0 1
 RUN 12

CATEGORY BN
 LINE 17300 "ARTESIA " 69.0 17512 "HOOKERTP" 69.0 1
 RUN 13
 CATEGORY BN
 LINE 17503 "BOWIE " 69.0 17529 "SANSIMON" 69.0 1
 RUN 14
 CATEGORY BN
 LINE 17505 "BVISTATP" 69.0 17501 "B.VISTA " 69.0 1
 RUN 15
 CATEGORY BN
 LINE 17505 "BVISTATP" 69.0 17506 "CHARLSTN" 69.0 1
 RUN 16
 CATEGORY BN
 LINE 17506 "CHARLSTN" 69.0 17524 "PUEBLO69" 69.0 1
 RUN 17
 CATEGORY BN
 LINE 17507 "COCHISE " 69.0 17515 "JOHN JCT" 69.0 1
 RUN 18
 CATEGORY BN
 LINE 17513 "HUACHJCT" 69.0 17556 "S.CRUIZJT" 69.0 1
 RUN 19
 CATEGORY BN
 LINE 17502 "BENSON " 69.0 17555 "MESCALTP" 69.0 1
 RUN 20
 CATEGORY BN
 LINE 17521 "MESCAL " 69.0 17555 "MESCALTP" 69.0 1
 RUN 21
 CATEGORY BN
 LINE 17551 "COTTONWD" 69.0 17530 "ST.DAVID" 69.0 1
 RUN 22
 CATEGORY BN
 LINE 17512 "HOOKERTP" 69.0 17522 "MORT TAP" 69.0 1
 RUN 23
 CATEGORY BN
 LINE 17513 "HUACHJCT" 69.0 17514 "HUACHUCA" 69.0 1
 RUN 24
 CATEGORY BN
 LINE 17515 "JOHN JCT" 69.0 17555 "MESCALTP" 69.0 1
 RUN 25

CATEGORY BN	CATEGORY BN
LINE 17517 "KANSAS S" 69.0 17539 "CHIRICAH" 69.0 1	LINE 17531 "STEWART " 69.0 17512 "HOOKERTP" 69.0 1
RUN 26	RUN 39
CATEGORY BN	CATEGORY BN
LINE 17518 "KEAT JCT" 69.0 17511 "HAWES " 69.0 1	LINE 17531 "STEWART " 69.0 17504 "NEWMORTT" 69.0 1
RUN 27	RUN 40
CATEGORY BN	CATEGORY BN
LINE 17518 "KEAT JCT" 69.0 17519 "KEATING " 69.0 1	LINE 17532 "TOMB JCT" 69.0 17533 "TOMBSTON" 69.0 1
RUN 28	RUN 41
CATEGORY BN	CATEGORY BN
LINE 17522 "MORT TAP" 69.0 17306 "HOOKER " 69.0 1	LINE 17532 "TOMB JCT" 69.0 17534 "WEBB " 69.0 1
RUN 29	RUN 42
CATEGORY BN	CATEGORY BN
LINE 17522 "MORT TAP" 69.0 17550 "BONITA " 69.0 1	LINE 17533 "TOMBSTON" 69.0 17506 "CHARLSTN" 69.0 1
RUN 30	RUN 43
CATEGORY BN	CATEGORY BN
LINE 17504 "NEWMORTT" 69.0 17523 "MORTENSN" 69.0 1	LINE 17534 "WEBB " 69.0 17520 "MCNEAL " 69.0 1
RUN 31	RUN 44
CATEGORY BN	CATEGORY BN
LINE 17544 "HERFRDTP" 69.0 17545 "HEREFORD" 69.0 1	LINE 17535 "WILCOXJT" 69.0 17531 "STEWART " 69.0 1
RUN 32	RUN 45
CATEGORY BN	CATEGORY BN
LINE 17545 "HEREFORD" 69.0 84897 "PALOMNAS" 69.0 1	LINE 17535 "WILCOXJT" 69.0 17536 "WILLCOX " 69.0 1
RUN 33	RUN 46
CATEGORY BN	CATEGORY BN
LINE 17526 "HAWES SW" 69.0 17511 "HAWES " 69.0 1	LINE 17539 "CHIRICAH" 69.0 17534 "WEBB " 69.0 1
RUN 34	RUN 47
CATEGORY BN	CATEGORY BN
LINE 17511 "HAWES " 69.0 17518 "KEAT JCT" 69.0 1	LINE 17550 "BONITA " 69.0 17523 "MORTENSN" 69.0 1
RUN 35	RUN 48
CATEGORY BN	CATEGORY BN
LINE 17544 "HERFRDTP" 69.0 17525 "RAMSEY " 69.0 1	LINE 17555 "MESCALTTP" 69.0 17502 "BENSON " 69.0 1
RUN 36	RUN 49
CATEGORY BN	CATEGORY BN
LINE 17544 "HERFRDTP" 69.0 17527 "GARDENSW" 69.0 1	LINE 17555 "MESCALTTP" 69.0 17521 "MESCAL " 69.0 1
RUN 37	RUN 50
CATEGORY BN	CATEGORY BN
LINE 17528 "S.VISTA " 69.0 17505 "BVISTATP" 69.0 1	LINE 17556 "S.CRUIZJT" 69.0 17513 "HUACHJCT" 69.0 1
RUN 38	RUN 51

CATEGORY BN	CATEGORY BN
LINE 17502 "BENSON " 69.0 17508 "DAVIDJCT" 69.0 1	XFMR 84822 "MURAL " 69.0 85805 "MURAL 11" 12.5 1
RUN 52	RUN 65
CATEGORY BN	CATEGORY BN
LINE 17507 "COCHISE " 69.0 17515 "JOHN JCT" 69.0 1	XFMR 84823 "SANPEDRO" 69.0 85807 "SANPEDR " 12.5 1
RUN 53	RUN 66
CATEGORY BN	CATEGORY BN
LINE 84824 "SPEDROTP" 69.0 17520 "MCNEAL " 69.0 1	XFMR 84821 "FAIRVIEW" 69.0 84995 "FAIRVIEW" 34.5 1
RUN 54	RUN 67
CATEGORY BN	CATEGORY BN
LINE 17015 "PANTANO " 115.0 17039 "KARTCHNR" 115.0 1	XFMR 84821 "FAIRVIEW" 69.0 85804 "FAIRVW11" 12.5 1
RUN 55	RUN 68
CATEGORY BN	CATEGORY BN
LINE 84820 "DON LUIS" 69.0 84822 "MURAL " 69.0 1	LINE 17002 "APACHE " 230.0 17007 "BUTERFLD" 230.0 1
RUN 56	RUN 69
CATEGORY BN	CATEGORY BN
LINE 84820 "DON LUIS" 69.0 84897 "PALOMNAS" 69.0 1	LINE 17007 "BUTERFLD" 230.0 17016 "PANTANO " 230.0 1
RUN 57	RUN 70
CATEGORY BN	CATEGORY BN
LINE 84822 "MURAL " 69.0 84824 "SPEDROTP" 69.0 1	LINE 17676 "NEWTUCSN" 230.0 17016 "PANTANO " 230.0 1
RUN 58	RUN 71
CATEGORY BN	CATEGORY BN
LINE 84823 "SANPEDRO" 69.0 84824 "SPEDROTP" 69.0 1	LINE 17007 "BUTERFLD" 230.0 17020 "SAN RAF " 230.0 1
RUN 59	RUN 72
CATEGORY BN	CATEGORY BN
LINE 84821 "FAIRVIEW" 69.0 84824 "SPEDROTP" 69.0 1	LINE 16230 "FT.HUACH" 138.0 16220 "VAIL " 138.0 1
RUN 60	RUN 73
CATEGORY BN	CATEGORY BN
LINE 84824 "SPEDROTP" 69.0 17520 "MCNEAL " 69.0 1	LINE 17001 "APACHE " 115.0 19020 "ADAMSTAP" 115.0 1
RUN 61	RUN 74
CATEGORY BN	CATEGORY BN
XFMR 84897 "PALOMNAS" 69.0 85862 "PALOMNAS" 12.5 1	LINE 19221 "NOGALES " 115.0 19020 "ADAMSTAP" 115.0 1
RUN 62	RUN 75
CATEGORY BN	CATEGORY BN
XFMR 84820 "DON LUIS" 69.0 85803 "DON LUIS" 12.5 1	LINE 14362 "BOOTHILL" 115.0 14353 "MURAL " 115.0 1
RUN 63	RUN 76
CATEGORY BN	CATEGORY BN
XFMR 84822 "MURAL " 69.0 14353 "MURAL " 115.0 1	LINE 14362 "BOOTHILL" 115.0 14350 "ADAMS " 115.0 1
RUN 64	RUN 77

CATEGORY BN
XFMR 17016 "PANTANO " 230.0 17015 "PANTANO " 115.0 1
RUN 78
CATEGORY BN
XFMR 17039 "KARTCHNR" 115.0 17038 "KARTCHNR" 69.0 1
RUN 79
DONE